

CLAIMS

1. A chainless container-transporting device for transporting square-cylindrical containers by holding them with container holders formed between container-transporting means arranged to face parallel with each other, wherein the container-transporting means is equipped with: a number of blocks having a holding part constituting a part of the container holders; an outward block-support member and a homeward block-support member, arranged by extending in the conveying direction, for supporting the number of blocks in a movable condition along the conveying direction; a first transfer means provided between the terminal end of the outward block-support member and the start end of the homeward block-support member, capable of sequentially transferring the blocks that have been conveyed while being supported by the outward block-support member to the homeward block-support member; a second transfer means provided between the terminal end of the homeward block-support member and the start end of the outward block-support member, capable of sequentially transferring the blocks that have been conveyed while being supported by the homeward block-support member to the outward block-support member; and a block delivering means capable of delivering and conveying blocks so that each block can circulate in the order of outward block-support member, first transfer means, homeward block-support member, second transfer means and outward block-support member...

2. The chainless container-transporting device according to claim 1, wherein the block-delivering means is so constructed

that it can deliver one or more blocks to the downstream side of the conveying direction, and that an adjacent block can be sequentially conveyed by the block being delivered, to the downstream side of the conveying direction.

3. The chainless container-transporting device according to claim 1 or 2, wherein the block-delivering means is so constructed that it can intermittently deliver and convey one or more blocks by a given pitch, to the downstream side of the conveying direction.

4. The chainless container-transporting device according to any one of claims 1 to 3, wherein the block-delivering means is so constructed that it can deliver blocks supported by the outward block-support member and/or homeward block-support member to the downstream side of the conveying direction.

5. The chainless container-transporting device according to any one of claims 1 to 4, wherein two or more block-delivering means are provided.

6. The chainless container-transporting device according to any one of claims 1 to 5, wherein the block-delivering means is equipped with a drive shaft and a pair of discs or a column having on its circumferential surface convex parts or concave parts capable of engaging with and delivering the blocks to the downstream side of the conveying direction.

7. The chainless container-transporting device according to claim 6, wherein the block is equipped with a rotatable rod-shaped

member which gears into the concave parts formed on the outer circumferential surface of the pair of discs or the column.

8. The chainless container-transporting device according to any one of claims 1 to 5, wherein the block-delivering means is equipped with a block engaging-and-pushing member which moves forward and backward by a given stroke, capable of delivering one or more blocks while engaging therewith to the downstream side of the conveying direction.

9. The chainless container-transporting device according to any one of claims 1 to 8, wherein the outward block-support member and the homeward block-support member are two respective guide rails disposed above and beneath the block.

10. The chainless container-transporting device according to claim 9, wherein the guide rails are rod-shaped guide rails having a circular or polygonal cross-section.

11. The chainless container-transporting device according to claim 9 or 10, wherein the portion supporting the blocks delivered by the block-delivering means of the guide rails has a rectangular cross-section.

12. The chainless container-transporting device according to any one of claims 9 to 11, wherein the portion other than the portion supporting the block delivered by the block-delivering means of the guide rails has a circular cross-section.

13. The chainless container-transporting device according to

any one of claims 9 to 12, wherein the guide rail has a roller for reducing the slide-friction factor at a part in contact with the block.

14. The chainless container-transporting device according to claim 13, wherein the roller is provided on the portion supporting blocks delivered by the block-delivering means of the guide rails.

15. The chainless container-transporting device according to any one of claims 1 to 14, wherein the first transfer means and/or the second transfer means are equipped with a pair of discs or a column having on its circumferential surface concave parts or convex parts capable of guiding and transferring the block while engaging therewith.

16. The chainless container-transporting device according to any one of claims 1 to 15, wherein the first transfer means and/or the second transfer means are equipped with a U-shaped connection block-support member connected to the outward block-support member or the homeward block-support member.

17. The chainless container-transporting device according to claim 16, wherein the connection block-support member is a connection guide rail having a rectangular cross-section.

18. The chainless container-transporting device according to claim 16 or 17, wherein the connection block-support member has a roller for reducing the slide-friction factor at a part in contact with the block.

19. The chainless container-transporting device according to claim 18, wherein the roller is provided on a linear part near a bent part of the U-shaped connection block-support member.

20. The chainless container-transporting device according to claim 19, wherein the roller provided on both the linear parts flanking the bent part of the U-shaped connection block-support member, is provided in a larger number on the downstream-side linear part compared to the upstream-side linear part.

21. The chainless container-transporting device according to any one of claims 1 to 20, wherein the first transfer means and/or the second transfer means have a U-shaped guide member for supporting the blocks from the inner side and/or outer side of the blocks.

22. The chainless container-transporting device according to any one of claims 1 to 21, wherein the container holder is constituted by a holding part for holding at least two opposing angular corners of a square-cylindrical container.

23. The chainless container-transporting device according to any one of claims 1 to 22, wherein the adjacent blocks are connected with a permanent magnet.

24. The chainless container-transporting device according to any one of claims 1 to 23, which is equipped with a container-support member situated on the lower side of the transported container, for providing a bottom support for the

container.

25. The chainless container-transporting device according to any one of claims 1 to 24, wherein an upwardly and downwardly penetrating opening is formed at a given position of the container-support member, and a container lifting-and-lowering means is equipped, which means being capable of inserting through the opening a container lifting-and-lowering member for pushing up the container from the bottom part to the upper side and for lowering it to its original position.

26. The chainless container-transporting device according to any one of claims 1 to 25, wherein the device is constructed to be equipped on a filling-and-packaging machine for filling and packaging content in the container.